

Date: Wed, 13 Apr 94 09:42:54 PDT
From: Info-Hams Mailing List and Newsgroup <info-hams@ucsd.edu>
Errors-To: Info-Hams-Errors@UCSD.Edu
Reply-To: Info-Hams@UCSD.Edu
Precedence: Bulk
Subject: Info-Hams Digest V94 #412
To: Info-Hams

Info-Hams Digest Wed, 13 Apr 94 Volume 94 : Issue 412

Today's Topics:

(none)

Any experience with doppler rdf (radio direction finders)? (2 msgs)
 Bearcat Scanner Memory Loss
 EME Programs
 FluxGate magnetometers
 Heinous? hardly
 Icom 2SRA
 Low cost antenna required
 We wish you best 73's

Send Replies or notes for publication to: <Info-Hams@UCSD.Edu>
Send subscription requests to: <Info-Hams-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Info-Hams Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/info-hams".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: 13 Apr 94 14:38:08 GMT
From: news-mail-gateway@ucsd.edu
Subject: (none)
To: info-hams@ucsd.edu

To: info-hams@UCSD.Edu
News-Software: UReply 3.1
>Subject: Re: We wish you best 73's

In Info-Hams Digest V94 No. 410 (item 19)
dog.ee.lbl.gov!ihnp4.ucsd.edu!library.ucla.edu!news.ucdavis.edu!
modem66.ucdavis.edu!ddtodd@ucbvax.berkeley.edu writes:
>References <2o42ok\$8j1@oak.oakland.edu>, <1994Apr11.191406.17384@combdyn.com>,
<Co5p5B.8D1@news.ess.harris.com>davi

>Subject : Re: We wish you best 73's

>

>

>My favorite was the two repeater users in Stockton on a local repeater. Ham 1
>said "I wonder if we can talk to each other simplex?" Ham 2 " I don't know
>let's try" Ham 1 " How do we do it?" Ham 2 "Just hit the the reverse
>button." I eventually felt pity for them and helped explain how it worked for
>them and they were able to reach each other simplex but you really have to
>wonder how some people's minds work.

>

>cheers,

>dan

>=====

>Dan Todd ddtodd@ucdavis.edu KC6UUD

>

>Bill Clinton and Al Gore know that the Constitution guarantees an individuals
basic

>right to keep and bear arms, and they will uphold that right. - Whitehouse
Position Paper

>=====

>

I will often use the reverse function to tell if another amateur is
within simplex range while he/she is transmitting. That's a perfectly
valid way of determining whether simplex is an option. Holding a
conversation on the repeater output however is definitely questionable
behavior.

PS.. The only arms that Slick and Tonto want you to keep are the ones
attached to you at the shoulder.

73 de N1PBT...ron

Ron Rossi

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/=====/  
/ IBM Microelectronics      Internet:  rrossi@vnet.ibm.com  /  
/ H/P ASIC SRAM Design      VNET:    RROSSI at BTVLABVM    /  
/ Dept N93 Bldg 861-2        Voice:   802/769-7477         /  
/ 1000 River Road           RF:      N1PBT/AE              /  
/ Essex Junction, VT 05452-4299                               /  
/                                                                    /  
/ "I work for IBM, I don't represent its views!"              /  
/                                                                    /  
/=====/
```

Date: 13 Apr 94 06:06:30 GMT

From: agate!darkstar.UCSC.EDU!nic.scruz.net!cruzio!comix!jeffl@ucbvax.berkeley.edu

Subject: Any experience with doppler rdf (radio direction finders)?

To: info-hams@ucsd.edu

In article <1994Apr8.220021.29409@Csl.Stanford.EDU> pkahn@Csl.Stanford.EDU
(Philip Kahn) writes:

>I have been reading up on doppler RDF's. The Amateur Radio Handbook

>has an article that says they can only do well to about 5 degrees.

>Have you heard of systems or ways to do it that gives better results?

In 1976, I helped design the AN/SRD-22 doppler direction
finder for Intech. The USCG specification was 1 degree
resolution. 3 degree total variation over a wider temperature
range. This is radically better than the typical Roanoak
or Doppler systems design. This accuracy was achievable,
but in my estimation worthless. Reasons to follow.

In order to maintain a stable phase shift from the antenna,
through the receiver, and finally to the inevitable phase
comparator, some compensation is required. The following
are the basic error sources and the solutions required.

The antenna is 4 vertical tubes with pin diode attenuators
(not switches) in series. These attenuators are driven
in quadrature with a modified sine wave to give a low
distortion diode resistance vs time waveform. Any distortion
in the drive waveform cause errors at points BETWEEN quadrature
points.

The largest cause of phase errors in the receiver is the IF
crystal filter. The AN/SRD-22 uses a 4KHz drive signal where
the 2nd harmonic and above (i.e. any distortion) ends up outside
the IF crystal filter bandwidth. Slight changes in frequency
yielded monstrous changes in phase shift through the filter.
The receiver needed an automatic frequency control to insure
that the ADF tones would always land on the same place in the
IF xtal filter.

With weak signals, it was found that signal strength affected
the phase shift through the receiver. The final limiter and
quadrature demodulator was the largest contributor. An
automatic gain control was required to fix this.

The demodulated 4Khz tone was filtered after demodulation by
a commutating filter. The initial bandwidth was about 1Hz.
Clock leakage and switching transients became a large source

of errors. This required very careful board layout.

To give a rough approximation of the distortion requirements, 1 degree total accuracy is 1 part in 360 or 0.28% total error or distortion. At 1Hz bandwidth, it may take 20 seconds to obtain a stable reading.

The reason the Roanoak and Doppler Systems switched antenna systems function is that the environmental sources of error far exceed the instrument errors. A 130ft vessel or moving vehicle is NOT a stable platform and is subject to errors induced by ground or sea reflections, multipath, antenna tilt, polarization, faraday rotation, mechanical damage, and multiple transmitter sources. Any ONE of these can induce enormous errors. Multiple transmitters (including intermod, garbage, grunge, rfi, emi, computer noise, skip, etc) are the worst as they generate totally false readings. Another major botch is the 0-360degree digital display. Since the readings tend NOT to be stable, getting an accurate bearing is like reading a digital watch that can't decide what time it is. Error induced by drive waveform distortion, signal levels, and such are reasonably small. There are other problems introduced by switching type antennas, but they do not affect the basic accuracy. Only the crystal filter errors are large enough to justify an AFC. My guess is that +/-5 degree overall accuracy for a fixed base is the best that can be expected. +/-15 degrees is about the best for a mobile.

This technology is now 20 year old. Were I to do it today, I would use DSP to filter and demodulate the tone, statistical algorithms to reduce erroneous readings, beam steering to deal with reflections, adjustable filter bandwidth, and intelligent display control.

--
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408.699.0483 digital_pager 73557,2074 cis [don't]
jeffl@comix.santa-cruz.ca.us scruc.ucsc.edu!comix!jeffl

Date: 13 Apr 94 07:09:09 GMT
From: agate!darkstar.UCSC.EDU!nic.scruc.net!cruzio!comix!jeffl@ucbvax.berkeley.edu
Subject: Any experience with doppler rdf (radio direction finders)?
To: info-hams@ucsd.edu

In article <1994Apr11.144914.25061@ke4zv.atl.ga.us> gary@ke4zv.atl.ga.us (Gary Coffman) writes:

>2) The higher the switching speed, the greater the doppler, and the easier
>small angle changes are to measure. So you want to use as high a switching
>rate as you can manage. This also relates to 3 and 4 below.

One problem with switching as opposed to sine wave driven attenuation is that switching creates a "comb line" of modulation spectra that extends well beyond the bandwidth of the crystal filter. Put differently, 33.3% of the energy in a square wave drive signal is in the odd harmonics of the fundamental. This results in significant spurious responses in the adjacent channel area. Doppler Systems used DG-MOSFETS with a "soft" switching characteristic to reduce these spurs.

One of the major reasons that amplitude based, rotating yagi or quad antenna direction finders are becoming popular is that they can separate multiple carriers on the same frequency. Another advantage is that they can visibly show a false reflection or multipath signal. The doppler direction finders go insane when faced with multiple signals. Rotating quad do not have the acquisition speed of a doppler system, but potentially are a more accurate and better system.

If you are interested in maximum accuracy, I suggest a "Lorenz" style antenna system. This was used by the Germans during the Battle of Britain for guiding the bombers to their target. Two directional antennas were aimed in the general direction of the target. The two antennas had a -3db beamwidth of about 15 degrees and were aimed 15 degrees apart. A single transmitter was alternately tone modulated and switched between the two antennas. When switched to the left antenna, it would send morse "A". The right would be "N". The dots and dashes were interleaved. If the bomber was exactly between the two beams, the signal strength from the two antennas would be identical and a continuous modulation tone would be heard. Any deviation from centre would cause the letter "A" or "N" to be heard depending upon direction. The beam was said to be 500ft wide at a distance of 100 miles on about 60Mhz. See "The Wizard War" by R.V. Jones.

A similar antenna arrangement could be constructed and rotated. Instead of generating the signals, the direction finder would be a synchronous antenna switch and AM demodulator. When the signal levels are equal, the carrier is half way between the antennas. The Intech AN-SRD/21 homer direction finder worked on similar principles, but without a rotating or directional antenna. Instead the entire vessel was rotated until the signals strengths were equal. A 1 degree resolution was easy. However, mechanical considerations prevented achieving this on a 43 ft vessel. +/-10 degree was typical and adequate.

>A 4 pole antenna array only gives 4
>sample points to define the waveform. Theoretically that's enough, but
>it's easier with an 8 or 16 antenna array.

That's what I thought until I tried it. The problem is that the "unused" (i.e. the elements that are turned off) get in the way. A 16 element array worked just fine when both the transmitting and receiving antennas were exactly vertically polarized. Tilt one antenna slightly, and other elements acted as a polarization filter and drastically reduced the received signal. In the "attenuator" flavour of antenna (as opposed to the switched flavour), the resultant distortion and noise was intolerable.

>4) The wider and flatter the phase bandwidth of the radio, the more precisely
>it will pass the doppler shift information on to the resolver.

True. However, the wider the IF, the better chance a signal on an adjacent channel will mangle the readings.

>This latter is a problem when using typical ham receivers, so switch speeds
>are typically held down to 2 kHz or less for a 4 pole array. This corresponds

Nope. The reason is that the closer the tone is to the center carrier frequency (i.e. lower modulation frequency), the less effect the effects of the carrier being off frequency. Group delay (phase errors) increases toward the IF filter band edges and are flattest in the middle.

Another interesting method of direction finding is to use the same technique as the satellite (forgot name) which monitors the ELT (121.5Mhz) frequency. It uses doppler shift for locating. The satellite follows an exactly known path. A transmitter on the ground creates a doppler shift that changes from high to low as the satellite passes. The rate of change during this transition can be used to locate a line of position.

The same method can be done on the ground. I visualize a GPS receiver into a laptop. The received signal and doppler shift are measured exactly while roaring down the freeway. Increased shift means you're approaching the transmitter. Decreasing means you're going away. The carrier frequency, doppler shift, direction, and speed are all known. The rest is number crunching.

Ugh. Back to taxes...

--

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408.699.0483 digital_pager 73557,2074 cis [don't]
jeffl@comix.santa-cruz.ca.us scruc.ucsc.edu!comix!jeffl

Date: 13 Apr 1994 05:29:22 GMT
From: ihnp4.ucsd.edu!galaxy.ucr.edu!library.ucla.edu!psgrain!news.tek.com!
soul.tv.tek.com!johnr@network.ucsd.edu
Subject: Bearcat Scanner Memory Loss
To: info-hams@ucsd.edu

I've acquired an old Bearcat scanner, model 160. It seems to work OK, except that if I unplug it overnight, it loses it's memory. I replaced the batteries, but still no luck. I've measured 10ma of current flowing out of the batteries (two 9V cells in series) when the AC cord is unplugged. This seems high.

Is this a documented failure mode with old Bearcat scanners?

Thanks for any info,

John Reynolds NZ7J

Date: 12 Apr 94 09:15:29 CDT
From: elroy.jpl.nasa.gov!sdd.hp.com!usc!howland.reston.ans.net!vixen.cso.uiuc.edu!
uchinews!cdsmail!timbuk.cray.com!walter.cray.com!ned.cray.com!cbetz@ames.arpa
Subject: EME Programs
To: info-hams@ucsd.edu

In article <9404071257.AA13047@cmr.ncsl.nist.gov>, rc@cmr.ncsl.NIst.GOV (Robert Carpenter) writes:

> In response to the recent request for leads to PC programs helpful to EME
> operators, may I suggest "SKYMOON" by W5HN. While I don't operate EME, I've
> seen Dave use it a few times and it looks very nice. The fact that W5HN has
> the first DXCC on 144 MHz shows it con't be TOO bad.
> 73 de Bob w3otc@amsat.org

I assume you mean W5UN? I've not personally used this one, but it is pretty good from what I've seen.

There is also a new program available from Paul, N1BUG, that also includes spatial polarity calculations (not sure if SKYMOON does that or not).

Also, Dr. Michael Owen, (who is on internet by the way) has programs available. His email address is: MROWEN%STLAWU.bitnet@CUNYVM.CUNY.EDU

There is also another public doamin program available from VK3UM. It is available at one of the archive sites on internet, but I can't remember where (sorry).

Hope this helps.

Charlie Betz NOAKC
Cray Research, Inc. Chippewa Falls, WI

Date: 13 Apr 94 13:00:59 GMT
From: news-mail-gateway@ucsd.edu
Subject: FluxGate magetometers
To: info-hams@ucsd.edu

Friends -

A number of people have asked me to add a better means of determining antenna azimuth to my EME/satellite tracknig program, RealTrak. Currently, RT supports a bunch of A/D boards including several 12-bit boards... the user supplies antenna position via potentiometers and the A/D board figures out the azimuth/elevation. This is, however, not sufficiently accurate for *big* antennas because pots aren't very linear, they drift with temperature, etc.

I have solved the elevation problem by interfacing with the SmartLevel, a digital carpenter's level (0.1 degree) with RS-232 output. Slick!

BUT... what about azimuth? Optical encoders are one possibility, but they're a pain when the power goes off, plus many of them would require an interface board to the computer.

Some people have suggested using a fluxgate magetometer for antenna azimuth. Sounds like a good idea: you can "zero out" your support structure, it gives good reliability, even good accuracy.

The only propblem is the cost: \$700 or so is the best that I have found. We need something like 1 degree accuracy (better if possible, of course), with RS-232 output.

So, does anyone out there have any leads? I'd be happy just to get a few manufacturer's telephone numbers and chase down the costs myself.

Thanks !

Michael R. Owen, Ph.D. a.k.a.: W9IP
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(315) 379-5975 - voice - (315) 379-0161 (6-9pm)
e-mail: MOWE@SLUMUS FAX - (315) 379-5804

Date: 13 Apr 94 14:24:57 GMT
From: news-mail-gateway@ucsd.edu
Subject: Heinous? hardly
To: info-hams@ucsd.edu

In Info-Hams Digest V94 No. 410 (item 8) dog.ee.lbl.gov!ihnp4.ucsd.edu!
pacbell.com!att-out!cbnewsh!ostroy@ucbvax.berkeley.edu
>until I see an official proclamation of someone being appointed
>arbiter of "good operating technique" I'll keep an open mind.
>
>73, Dan
>

I know someone who called himself the "Emily Post" of good operating
habits on a local repeater. Will he do?? I'd say who it was, but
only Vermonters would understand the humor.

73 de N1PBT...ron

Ron Rossi

/=====/
/ IBM Microelectronics Internet: rrossi@vnet.ibm.com /
/ H/P ASIC SRAM Design VNET: RROSSI at BTVLABVM /
/ Dept N93 Bldg 861-2 Voice: 802/769-7477 /
/ 1000 River Road RF: N1PBT/AE /
/ Essex Junction, VT 05452-4299 /
/ /
/ "I work for IBM, I don't represent its views!" /
/ /
/=====/

Date: Wed, 13 Apr 1994 07:11:22 GMT
From: ihnp4.ucsd.edu!pacbell.com!sgiblab!swrinde!sdd.hp.com!

saimiri.primate.wisc.edu!hpg30a.csc.cuhk.hk!hkuxb.hku.hk!pckwong@network.ucsd.edu
Subject: Icom 2SRA
To: info-hams@ucsd.edu

x3670 (lieser@iccgcc.cs.hh.ab.com) wrote:

: I'm planning to take my first (Tech) exam in the near future, and
: was thinking of buying an Icom 2SRA so as to have some scanner
: coverage in addition to the ability to transmit on 144-148MHz.
: Are there any problems with coupling a wide-coverage scanner with
: the transmitter? Is the 2SRA easy to use, and is its performance
: good? I'm wondering if I should just go with a simpler (and cheaper)
: rig.
:
: Thanks in advance,
: Ed Lieser
: Allen-Bradley Co., Cleveland, Ohio

Both are negative, not easy to use although not difficult. For
scanner part, same as many other articles posted before, not
too bad but never expect too much from it.

- Philips W0ng, VR2XVI

Date: 13 Apr 94 15:13:23 GMT
From: hp-cv!hp-pcd!hpcvsnz!dickrb@hplabs.hp.com
Subject: Low cost antenna required
To: info-hams@ucsd.edu

Greetings

If you have some 'long-haul' paths for tee-vee or FM for that matter,
then you will find that a rhombic antenna will do what you want for a
very modest cost (probably less than \$10).

I used a design that had 55 feet per leg and spacings of 33 and 105 feet
along the short and long directions (the long direction pointed at the
station 2b received. I lived 50 miles north of 'frisco' and west of
Santa Rosa, CA and it worked very well for the SF stations.

There are many many sources for rhombic designs (ARRL handbook, etc) so
you can, as Joe-Bob Briggs says - 'Check it out'.

Good luck

de w7wkr

Date: 13 Apr 1994 05:20:19 GMT
From: ihnp4.ucsd.edu!usc!howland.reston.ans.net!pipex!bnr.co.uk!corpgate!bnrgate!
bmerha64.bnr.ca!news%bmerha64@network.ucsd.edu
Subject: We wish you best 73's
To: info-hams@ucsd.edu

In article <ddtodd.23.000CFCD0@ucdavis.edu>
ddtodd@ucdavis.edu (Daniel D. Todd) writes:

> My favorite was the two repeater users in Stockton on a local repeater. Ham 1
> said "I wonder if we can talk to each other simplex?" Ham 2 " I don't know
> let's try" Ham 1 " How do we do it?" Ham 2 "Just hit the the reverse
> button." I eventually felt pity for them and helped explain how it worked for
> them and they were able to rech each other simplex but you really have to
> wonder how some people's minds work.
More like: "...how some peoples minds *don't* work."

My favorite: Ham 1, into the repeater: "I just upped the power to
50 watts. Am I coming in stronger now?" Ham 2: "Hmm, well, a little
stronger on the S-meter, but not much."

~~~~~  
Fred M. Davis | These opinions are mine and are not  
Northern Telecom Ltd. | necessarily those of the company  
Semiconductor Components Group | fmdavis@bnr.ca  
Nepean, ON. | va3fd@k9iu.ampr.org  
A.R.O. VA3FD | freddy.davis@lambada.oit.unc.edu  
~~~~~

Date: 13 Apr 94 12:33:54 GMT
From: agate!howland.reston.ans.net!europa.eng.gtefsd.com!emory!wa4mei!ke4zv!
gary@ucbvax.berkeley.edu
To: info-hams@ucsd.edu

References <060494b2206@bobsbox.rent.com>,
<1994Apr8.152302.11864@ke4zv.atl.ga.us>, <phb.766157411@melpar>
Reply-To : gary@ke4zv.atl.ga.us (Gary Coffman)
Subject : Re: 6 meters

In article <phb.766157411@melpar> phb@syseng1.melpar.esys.com (Paul H. Bock)
writes:

>
> Good advice, but one caution: The IC-735 transverter output is
> only about 60 mV, or around -10 dBm. Some of the transverter designs

>I've seen (and kits as well, such as from DownEast Microwave) require
>1 mw of input (0 dBm) which is about 225 mV rms. Check the design
>carefully to see if there is an input pad which can be removed, or
>if a low-level stage can be added as an option (DownEast has indicated
>that they will do this on their 6/2/220 MHz transverter kits).

Many of the European transverter designs work with input levels as low as -40 dbm. And the IC-735 is easily modified for higher output, or a MMIC stage can boost the level to 1 mW easily. This level mismatch shouldn't be a deterrent, but it is something you need to be aware of, if you're expecting plug and play.

Gary

--

Gary Coffman KE4ZV		You make it,		gatech!wa4mei!ke4zv!gary
Destructive Testing Systems		we break it.		uunet!rsiatl!ke4zv!gary
534 Shannon Way		Guaranteed!		emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244				

Date: 13 Apr 94 14:13:22 GMT
From: newsgate.melpar.esys.com!melpar!phb@uunet.uu.net
To: info-hams@ucsd.edu

References <1994Apr8.152302.11864@ke4zv.atl.ga.us>, <phb.766157411@melpar>,
<1994Apr13.123354.4178@ke4zv.atl.ga.us>~
Subject : Re: 6 meters

gary@ke4zv.atl.ga.us (Gary Coffman) writes:

>or a MMIC stage can boost the level to 1 mW easily. This level mismatch
>shouldn't be a deterrent, but it is something you need to be aware of,
>if you're expecting plug and play.

Ah, yes, that's the key phrase: "Plug and play." Many newer hams expect to be able to just do exactly that, without worrying about levels or anything else. DEM told me once that they get a lot of calls asking "Can I just plug my Suribachi JAT-1500 into your 432 transverter?" and their answer is usually something like "Well, what's the output level?" which is met by silence on the other end.....Part of the problem may be that companies like DEM assume that anyone wanting to play at weak-signal VHF/UHF/SHF is technically knowledgeable enough to figure out how to interface, how to do T/R switching, etc., when in fact many hams are viewing these "specialty kit" suppliers as extensions of the OEM, which is definitely NOT the case. Perhaps the advertising should reflect that.

BTW, the North East Weak Signal Group is having a meeting this Saturday in Vernon, CT, at 1:00 PM, at the Quality Inn just off I-84. The topic of the technical presentation is - you guessed it - interfacing commercial hf transceivers to VHF/UHF/SHF transverters, and I am told that many of the most popular models (including the IC-735 and other Icoms, Kenwoods, Yaesus, etc.) will be covered. Contact Ron, WZ1V, for info (sorry, don't hve his address or telephone #, but he's in the Callbook).

(|_|) * Paul H. Bock, Jr. K4MSG * Internet: pbock@melpar.esys.com
| |) * Senior Systems Engineer * Telephone: (703) 560-5000 x2062

"You can have my bug when you can pry my cold, dead fingers from around it....." - anonymous radiotelegraph operator

End of Info-Hams Digest V94 #412
